II. Remarks

The Official Action of March 23, 2010 has been thoroughly studied. Accordingly the changes presented herein for the application, considered together with the following remarks are believed to be sufficient to place the application into condition for allowance.

By the present amendment, claims 1 and 14 have been amended in the manner courteously suggested by the Examiner on pages 2-3 of the Office Action.

In addition claim 1 has been amended to limit component (A) to a polyvalent amine compound.

Entry of the changes to the claims is respectfully requested.

Claims 1, 5, 8, 10, 12 and 14-16 are pending in this application.

On pages 2-3 of the Office Action the Examiner has objected to claims 1 and 14. Under this objection the Examiner has suggested changes to the claims which applicants have adopted in the present amendments to the claims.

Claims 1, 5, 8, 10 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,157,083 to Aonuma et al.

Claims 14-16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Aonuma et al. in view of U.S. Patent No. 6,156,849 to Moriyama et al.

For the reasons set forth below, it is submitted that each of the pending claims are allowable over the prior art of record and therefore, the outstanding rejection of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Aonuma et al. as disclosing:

> ...a rubber composition comprising a polymer obtained by adding maleic anhydride or a derivative thereof (abstract) which reads on acrylic elastomer of

> instant claims. The maleic anhydride derivative used include maleic acid monoalkyl esters such as monomethyl maleate (col. 2, lines 51-55) which reads on aliphatic unsaturated dicarboxylic acid monoalkyl ester. The composition is obtained by adding vulcanizing agents and antioxidants (col. 3, lines 16-18). See table 2, wherein vulcanization occurs in two stages (i.e. primary vulcanization and secondary vulcanization) under heating conditions, and the amount of modified rubber used is 100 parts by weight. The vulcanizate obtained can be used for producing various articles (col. 5, lines 3-20) which reads on article of instant claim 8.

The Examiner concedes that: "Aunoma et al. are silent with respect to press vulcanization and secondary oven vulcanization."

The Examiner has accordingly relied upon Moriyama et al as teaching:

> …acrylic elastomer comprising fumaric acid mono-lower alkyl ester. It is noted that fumaric acid mono-lower ester is an isomer of maleic anhydride derivative disclosed in Aunoma et al. The composition comprises diamine compound, vulcanization promoters and can be vulcanization molded into seal members (abstract). The composition is subjected to press vulcanization and then to secondary vulcanization in an oven (col. 6, lines 26-29).

In combining the teachings of Aonuma et al. and Moriyama et al. the Examiner has taken the position that:

> …it would have been obvious to subject the rubber composition of Aunoma et al. to press vulcanization because Aonuma discloses that the rubber composition if vulcanized in two stages and Moriyama has shown successfully that elastomeric compositions comprising acrylic elastomer, prepared from an isomer of maleic anhydride derivative disclosed in Aunoma et al can be subjected to press vulcanization followed by oven vulcanization.

There are a number of differences between Aonuma et al. and the present invention which the Examiner has not properly considered.

It is believed that these differences distinguish the present invention over Aonuma et al.

Aonuma et al. discloses a rubber composition comprising a polymer that is obtained by adding maleic anhydride or a derivative thereof to a nitrile-group-containing highly saturated polymer rubber as stated in the abstract.

Aonuma et al. relates to maleic anhydride (derivative)-modified, hydrogenated NBR.

In contrast, the present invention relates to a carboxylic group-containing acrylic rubber.

Even though the maleic anhydride (derivative)-modified, hydrogenated NBR of Aonuma et al. and the carboxylic group-containing acrylic rubber of the present invention are similar in regards to the carboxylic group-containing component, the base polymers of these two are completely different.

Vulcanization of maleic anhydride (derivatives)-modified hydrogenated NBR is carried out by peroxide crosslinking or sulfur vulcanization. In the case of sulfur vulcanization, there is a description that 2-mercaptobenzothianzole (Zn or Ni salt) can be used as a vulcanizing accelerator (or promoter) (column 3, lines 40-54); however there are no examples where in sulfur vulcanization is carried out.

In contrast, in the present invention only a polyvalent amine compound is used as a vulcanizing agent. Polyvalent amines compounds, and applicants' preferred p-substituted aromatic diamines, are not disclosed as vulcanizing agents in Aonuma et al.

In Aonuma et al. N-phenyl-N'-isopropyl-p-phenylenediamine is used as an antiozonant; however, N-substituted diamine compounds acts as a antiaging agent such as an antiozonant, etc. and therefore, it is a well known fact that this kind of N-substituted compound has no "crosslinking" function.

Thus Aonuma et al. does not teach applicants' polyvalent amine vulcanizing agents.

The Examiner states several times "...when sulfur containing vulcanization agent is used..." however, aliphatic unsaturated dicarboxylic acid monoalkyl ester-copolymerized acrylic elastomer which is an elastomer component in the present invention does not cause sulfur vulcanization. Thus the Examiner's reference to the use of a sulfur containing vulcanization agent is not relevant to applicants' invention.

In order to emphasize this difference between the present invention and Aonuma et al. Independent claim 1 has been amended to recite a vulcanizing agent "consisting of" polyvalent amine compound.

Aonuma et al. is directed to a rubber composition having excellent strength characteristics while retaining a very good balance in performance characteristics. However, the rubber compositions of Aonuma et al. are not disclosed as having any particular compression set characteristics, or yet improved compression set characteristics which are the primary purpose of applicants' invention. Applicants' improved compression set characteristics are obtained by the above-mentioned different combination of the components of applicants' invention.

Moriyama et al. fails to teach the use of a thiazole-based compound. As is apparent from a comparison of Example 1 to Comparative Example 1 and from Example 8 and Comparative Example 2 of applicants' specification, the compression set of test O ring having a 5-mm in wire diameter cannot be improved without the use of a thiazole-based compound.

This improved effect is due to the fact that the thiazole-based compound is used as a secondary antioxidant according to the present invention.

In contrast, Aonuma et al. describes that "preferable examples of the vulcanization accelerators used together therewith are thiazole compounds such as 2-mercaptobenzothiazole, 2-mercaptothiazole and the like.' (Column 3, lines 46-49).

In Aonuma et al. 2-mercaptothiazole is not used as an antioxidant (according to applicants' invention), but rather as a vulcanizing accelerator together with a sulfur and/or sulfur-donating compound.

In contrast, in the present invention 2-mercaptothiazole is not used as vulcanizing accelerator, but rather as an antioxidant and only a di-o-tolylguanidine is used as a vulcanizing promoter in the Examples.

Overall it is submitted that applicants' claimed invention distinguishes over the prior art of record both with respect to the different components used in the present invention and with respect to the improvements in properties and characteristics, including compression set characteristics.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

Conclusion

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved; the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 23-1925 and please credit any excess fees to such deposit account.

Respectfully submitted,

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/Michael S. Gzybowski/
Michael S. Gzybowski, Reg. No. 32,816
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
524 SOUTH MAIN STREET
SUITE 200
ANN ARBOR, MI 48104
(734) 302-6046